

REMARKS

Claims 1-23 are pending in this application. Non-elected claims 10 and 19-25 have been withdrawn from consideration by the Examiner. By this Amendment, claims 1, 2, 5, 18, and 20 are amended, and claims 24 and 25 are cancelled. Support for the amendments to the claims may be found, for example, in the original claims, specification, and drawings. No new matter is added.

In view of the foregoing amendments and following remarks, reconsideration and allowance are respectfully requested.

I. Information Disclosure Statement

The Office Action indicates that a date for the Takiguchi et al. reference (reference 2) was not provided in the Information Disclosure Statement filed March 10, 2004. Applicants thank the Examiner for the indication that the reference was nevertheless considered.

The Takiguchi et al. reference was disclosed in the Extended Abstracts of the Japan Society of Applied Physics and Related Societies in 2003. The publication date of these Extended Abstracts is unclear. However, there is no doubt that the Extended Abstracts were distributed before the conference held from March 27-30, 2003, because the paper was available to the conference participants before the conference was held.

II. Objections to Claims

The Office Action objects to claims 1-9 and 11-18 for various informalities. By this Amendment, claims 1-9 and 11-18 are amended according to the Examiner's helpful suggestions. Accordingly, reconsideration and withdrawal of the objections are respectfully requested.

III. Rejections under 35 U.S.C. §112, Second Paragraph

A. Claim 2

The Office Action rejects claim 2 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Office Action asserts that the recitation of the phrase "modified or unmodified" is indefinite. Applicants respectfully traverse the rejection.

As provided by MPEP §2173.02, the essential inquiry is whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Definiteness of claim language must be analyzed, not in a vacuum, but in light of:

- a. The content of the particular application disclosure;
- b. The teachings of the prior art; and
- c. The claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.

The claim must be considered as a whole to determine whether the claim apprises one of ordinary skill in the art of its scope and, therefore, serves the notice function required by 35 U.S.C. §112, second paragraph, by providing clear warning to others as to what constitutes infringement of the patent. See, e.g., *Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372, 1379, 55 USPQ2d 1279, 1283 (Fed. Cir. 2000).

As pointed out by the Office Action, the specification, at page 11, lines 8–21, provides the following context for the term "modified":

The "nucleic acid" in the nucleic acid immobilization method of the present invention means a single- or double-stranded oligonucleotide or a polynucleotide, part or all of which may be modified (including substitutions); preferably, a single-stranded oligonucleotide or polynucleotide, part or all of which may be modified (including substitutions). Suitable examples of the

"nucleic acid" may be selected from group consisting of DNA, RNA, PNA (peptide nucleic acid), CNA (amino cyclohexanyl nucleic acid), HNA (hexitol nucleic acid), p-RNA (pyranosyl RNA), oligonucleotides consisting of the above-mentioned nucleic acid molecules, and polynucleotides comprising the above-mentioned nucleic acid molecules, etc. SNPs (single nucleotide polymorphisms) are also included in the above-mentioned nucleic acids.

Therefore, it is clear from this disclosure that "modified" includes, but is not limited to, substitutions. Applicants respectfully submit that in light of the above disclosure and the disclosure of the specification as a whole, coupled by what was known in the art at the time of invention, one of ordinary skill in the art would have interpreted the term "modified" to include the addition of tags, linkers, amino acids, inorganic molecules, organic molecules, etc., and would have interpreted the "unmodified" polynucleotides or oligonucleotides to include "wildtype" nucleic acids, naturally occurring mutations, etc.

Accordingly, Applicants respectfully submit that claim 2 meets the requirements of 35 U.S.C. §112, second paragraph. Reconsideration and withdrawal of the rejection are requested.

B. Claims 1-9 and 11-18

The Office Action rejects claims 1-9 and 11-18 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claims the subject matter which applicant regards as the invention. Claim 1 is amended to recite "R is selected from the group consisting of a hydroxyl group, an amino group, a ferrocenyl group, or a carboxyl group; and L¹ and L² are not both single bonds." Support for these amendments may be found, for example, in the specification at page 13, line 12. ("[H]owever, L¹ and L² may not be both single bonds."). Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. Claims 3 and 4

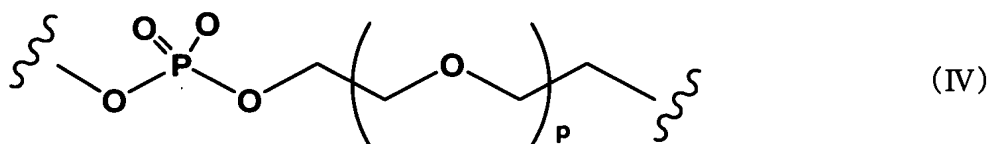
The Office Action rejects claims 3 and 4 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claims the subject matter which Applicants regard as the invention. Specifically, the Office Action asserts that the term "spacer" is indefinite, and that the specification only "'defines' spacer as 'low molecular weight molecules or low molecular weight substances'" (Office Action page 6, paragraph 15). However, as described in the specification, the terms "spacer molecule" and "spacer" refer to two distinct structures. The specification describes *spacer molecules*, not *spacers*, as "relatively low molecular weight molecules" (page 2, lines 27-28) and "low molecular weight substance[s]" (page 12, lines 28-29).

A spacer molecule corresponds to compound I and is represented by the formula $\text{HS-L}^1\text{-L}^2\text{-R}$. See specification at page 4, line 28 to page 5, line 1. For example, Compound I could be 6-mercapto-1-hexanol. See specification at page 6, lines 18-19.

On the other hand, a spacer may correspond to structure L^4 in compound II, which is represented by the formula $\text{HS-L}^3\text{-L}^4$ and is attached to the 3' end or the 5' end of the nucleic acid as the probe. See specification at page 5, lines 26-31.

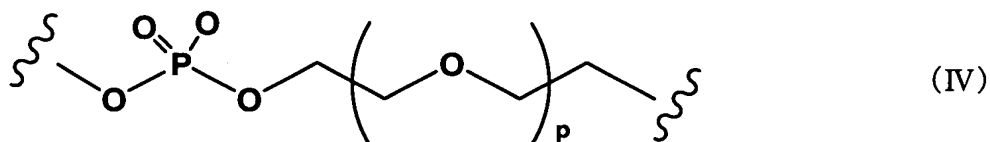
Moreover, a spacer may also correspond to structure L^5 in compound III, which is represented by the formula $\text{HS-(CH}_2)_3\text{-L}^4$ and is attached to the 5' end of the nucleic acid as the probe. See specification at page 5, line 31 to page 6, line 2.

Furthermore, the specification at page 12, lines 4-8, provides many alternative embodiments of L^4 and recites, " L^4 may be either a single bond *or a spacer*, but a single bond, *a group comprising polyethylene glycol...a nucleic acid, -CO-NH, and -NH-CO- is preferable*" (emphasis added). The specification at page 12, lines 8-11, recites that a "more preferable spacer is a group expressed by the following formula:



wherein p is an integer of 1 to 10."

Figure 1 shows that spacers and spacer molecules are distinct structures. Figure 1 shows 6-mercapto-1-hexanol as the spacer molecule, while the spacer is represented by the formula:



that is bonded to either the 3' end of the 5' end of the (AAAA)₄ nucleic acid probe.

Consequently, Applicants believe that they have particularly pointed out and distinctly claimed the subject matter which Applicants regard as the invention. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

IV. Rejections under 35 U.S.C. § 102

The Office Action rejects claims 1-9 and 11-18 under 35 U.S.C. §102(b) as being anticipated by Peterson et al. ("Peterson"), and rejects claims 1-9, 11-13, and 17 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,855,551 to Bawendi et al. ("Bawendi"). Applicants respectfully traverse the rejections.

Without conceding the propriety of the rejections, independent claim 1 is amended to more clearly recite various novel features of the claimed invention, with particular attention to the Examiner's comments. Specifically, claim 1 is amended to clarify that it is directed to "[a] method for immobilizing nucleic acid on a solid phase substrate by co-adsorption" (emphasis added). Despite their asserted disclosures, Peterson and Bawendi do not expressly or inherently describe such a method.

Peterson, at page 5164 under the heading "Immobilizing procedure," discloses methods for immobilizing nucleic acid on a solid phase substrate using an embedding method or a substitution method, but is silent as to immobilizing nucleic acid on a solid phase substrate by co-adsorption. Likewise, Bawendi fails to disclose a method of immobilizing nucleic acid on a solid phase substrate by co-adsorption, as required by claim 1.

For at least these reasons, Peterson and Bawendi do not anticipate independent claim 1. The remaining rejected claims variously depend from claim 1 and, thus, also are not anticipated by Peterson and Bawendi. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

V. Rejoinder

Applicants also respectfully request rejoinder of non-elected method claims 19, 22 and 23 and product claims 20 and 21. Where product and process claims are presented in the same application, Applicants may be called upon under 35 U.S.C. §121 to elect claims to either the product or process. MPEP §821.04. However, in the case of an elected product claim, rejoinder will be permitted when a product claim is found allowable and the withdrawn process claim depends from or otherwise includes all the limitations of an allowed product claim. *Id.* Because process claims 19, 22 and 23 include all the limitations of product claim 1, process claims 19, 22 and 23 must be rejoined with the product claims when the product claims are found allowable.

Furthermore, where restriction was required between independent or distinct products, and all claims directed to an elected invention are allowable, any restriction requirement between the elected invention and any non-elected invention that depends from or otherwise requires all the limitations of an allowable claim should be withdrawn. Claims that require all the limitations of an allowable claim should be rejoined and fully examined for patentability in accordance with 37 CFR 1.104. *See* MPEP §821.04(a). Because claims 20

and 21 include all the limitations of elected product claim 1, claims 19 and 20 must be rejoined with the product claims when the product claims are found allowable.

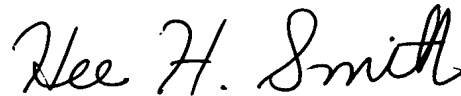
Because the elected product claims are believed to be allowable for at least the reasons presented above, Applicants respectfully request withdrawal of the Restriction Requirement and rejoinder of claims 19-22

VI. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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